

Pending Claims

1. An apparatus for performing biological reactions comprising:
 - a) a substrate comprising a first and a second surface;
 - b) an array of biomolecular probes positioned on said first surface; and
 - c) a flexible layer affixed to said first surface by an adhesive layer, forming a reaction volume;wherein said apparatus comprises at least a first port into said reaction volume.
36. An apparatus according to claim 1 wherein said biomolecular probes are oligonucleotides.
37. An apparatus according to claim 1 wherein said first port extends through said flexible layer.
38. An apparatus according to claim 1 wherein said first port extends from said second surface to said reaction volume.
39. An apparatus according to claim 1 wherein said substrate comprises glass.
40. An apparatus according to claim 1 wherein said substrate comprises a polymer.
41. An apparatus according to claim 1 wherein said substrate comprises ceramic.
42. An apparatus according to claim 1 wherein said substrate comprises silicon.
43. An apparatus according to claim 1 wherein said biomolecular probes are anchored to said first surface using polyacrylamide.
44. An apparatus according to claim 1 wherein said biomolecular probes are anchored to a continuous layer of polyacrylamide.
45. An apparatus according to claim 1 further comprising a heating element positioned under said reaction volume.
46. An apparatus according to claim 45 wherein said heating element is a resistive heater.
47. An apparatus according to claim 1 comprising a plurality of arrays of biomolecular probes, and said flexible layer, said adhesive layer and said first surface comprise a plurality of reaction volumes each containing one of said arrays.
48. An apparatus according to claim 1 wherein said flexible layer comprises plastic.

49. An apparatus according to claim 1 wherein said flexible layer comprises translucent plastic.
50. An apparatus according to claim 1 wherein said flexible layer comprises rubber.
51. An apparatus according to claim 1 wherein said flexible layer comprises polyester.
52. An apparatus according to claim 1 wherein said flexible layer comprises Teflon.
53. An apparatus according to claim 1 wherein said flexible layer comprises polypropylene.
54. An apparatus according to claim 1 wherein said flexible layer comprises polyethylene.
55. An apparatus according to claim 1 wherein said flexible layer comprises polyvinylidene chloride.
56. An apparatus according to claim 1 wherein said flexible layer is a gas permeable membrane.
56. An apparatus according to claim 1 wherein said reaction volume further comprises a water-soluble compound that is a solid at room temperature and a liquid at a second, higher temperature.
57. An apparatus according to claim 1 further comprising a scanner.
58. An apparatus according to claim 1 further comprising a sample preparation chip.
59. An apparatus according to claim 58 wherein said first port extends from said second surface to said reaction volume and said sample preparation chip is in contact with said second surface and wherein said sample preparation chip has a port that is aligned with said first port.
60. An apparatus according to claim 1 further comprising a roller, wherein said roller is in contact with said flexible layer.
61. A method of making an apparatus comprising:
 - a) providing a substrate with a first and a second surface, wherein said first surface comprises a continuous layer of derivatized polyacrylamide;
 - b) contacting said derivatized polyacrylamide with biomolecular probes;

- c) forming an amide bond between said derivatized polyacrylamide and said biomolecular probe;
- d) adding a flexible layer to said first surface to form a reaction volume.

62. A method of detecting the presence of a target molecule in a sample comprising:

- a) providing an apparatus comprising:
 - i) a substrate comprising a first and a second surface;
 - ii) an array of biomolecular probes positioned on said first surface; and
 - iii) a flexible layer affixed to said first surface by an adhesive layer, forming a reaction volume; wherein said apparatus comprises at least a first port into said reaction volume;
- b) introducing said sample through said first port into said reaction volume under conditions that allow the binding of said target molecule to at least one of said biomolecular probes; and
- c) detecting said binding as an indication of the presence of said target molecule.

63. A method according to claim 62 wherein said target molecule is labeled with a fluorescent label.